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ABSTRACT

The empirical study of knowledge representation is the focus of this paper, which observes that language as the cognitive instrument in the communication of phenomena must be capable of expressing relations of the observer-observation kind. The paper points out that this implies a coopeartive process at work in the production of a text, of which the basic components are agent, action, and objective. The paper then presents the AaO paradigm that defines the relations denoting the functions to be expressed in a verbal statement and emphasizes in particular the steering and controlling function of the agent. The paper concludes by noting that in contrast to the traditional way of investigating knowledge, that is to let the object component govern the analysis, the analysis system described in the paper is governed by the subject component (agent function), which increases the realism of the knowledge analysis by means of its capacity to differentiate the perspective information. Diagrams and tables illustrating the text are included. (HOD)

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The Agent Function as the Basis for Perspective Control

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Abstract

How to study knowledge representation on empirical grounds has been made the theme of this article. It emphasizes in particular the steering and controlling function of the agent. The agents of a text are bound to a perspective. By differentiating the perspective from the figure and its ground the method presented shows how these basic components covariate. Their coordinative structure is brought out by means of a topographic representation.

The empirical way of studying knowledge and knowledge representation presented in this article takes its point of departure in the fundamental assumption that any knowledge definition must necessarily be capable of differentiating between a subject and an object. This prerequisite is commonly accepted and forms the basis of two leading lines in scientific work. In its studies of knowledge, one starts from the object and claims that only the object oriented, that is purely formal models lead to scientifically founded knowledge. The other line maintains only the subject oriented models, that is those which are informally founded. In contrast to these two lines we have developed a method which shows

(1) that the subject component (agent function) is the fundamental one in the steering mechanism on which any knowledge analysis must be based, and

(2) that the perspective may be differentiated from the objects and be graphically displayed.

In knowledge work all over the world, natural language has the central role. This is because language is both an object of study and a cognitive instrument. However, in contrast to traditional, category-based efforts, we have in our methodological work concentrated on the inherent structure of natural language and have assumed that there is no way of circumventing the determination of an agent in designing knowledge models. The aim of this method development has been to show the functioning of the dynamic and syntactic means in natural language.

Experiment

Method

A pure linguistically based method, whether syntactic or augmented with lexico-semantic information, presupposes that information processing leading to knowledge representation is carried out by cognitive functions which consider neither an agent nor intentional actions. Such an approach has to be founded on some philosophical knowledge of the world. Thereby, cognition becomes synonymous with a function for the control of semantic categories. The techniques that have been utilized for measuring the result of cog-

nitive processes are mainly based on question-answering procedures by which facts are being controlled. Testing cognitive skills requires the texts to be linguistically perfect and logically sequenced. This is one reason why newspaper stories fit very well into this frame of reference. For, understanding, according to this view, becomes identical with logical deduction and inference, that is with internal operations which are non-sensitive to the outer world.

Language as the cognitive instrument in the communication of phenomena must be capable of expressing relations of the observer - observations kind, which implies that a cooperative process is at work in the production of a text. The basic components of this process are Agent, Action, and Objective. They represent the functional, structural, and dynamic aspects of an observation. The dynamic relations of the text are reflected through a series of AaO relations the way they are being manifested at the moment of observation. The integrative function of the agent has gotten its representation in the following formalization:

(Aa (AaO, ..., AaO)) (1)

This formalism (1) prescribes that the agent function must always be determinable. AaO establishes strict dependencies between agent, action, and objective. Formally, the analysis starts with the formula

(Ø action Ø) (2)

where Ø is a place holder. The place holder is replaced by a question mark (?), which denotes that we ask for what is the agent and towards what its action is directed.

Example: Replace ? in a text by agent: the researchers and objective: children, where the sentence is worded " The researchers studied children" . Provided that the verb " study " has been listed in a verb register, the algorithm developed can identify " The re-

searchers " as the agent and " children " as the objective.

This analysis expresses an asymmetrical relation (A → a → O) which differs fundamentally in kind from traditional methods in their formal description, as it is being made by the S ⇄ V ← O model (I. Bierschenk, 1984a).

The smallest common denominator in the process picked up by the AaO model is the relation between the agent and the objective of its action, that is agent and objective reside in the same organism.

Example: Seen from a dynamical perspective, the expression " The researchers are psychologists " comprises an action. In our definition, the connotations of the predicate are included in the connotations of the subject.

The definitions of the relations is synthetic, which makes it differ fundamentally from the way logicians and traditional linguists would define such an expression. They would have defined it analytically, that is as consisting of a subject part and a predicate part associatively linked by a copula, " are " (B. Bierschenk, 1984).

The identification of two or more agents (1) may be exemplified with " The researchers observed that children crawled over the edge ". Here, two agents are operating, whose steering functions can be unambiguously specified by means of the formalism presented (1). Its application requires that the functional differences in relation to the events be controlled. For this purpose, every observation has to be complete, or be made complete by the application of the rule system concerning the affinity between the A and the O. This measure, which is completely new, is absolutely necessary to take over an entire text, if the perspective structure shall be differentiated from the object structure and be lifted up from its linguistic carriers (Bierschenk & Bierschenk, 1984a,b).

For the identification of concepts and conceptual relations it is of fundamental importance that AaO gets a technical representation which corresponds to its syntactic manifestation in running

text. A routine has been developed and tested, one which prerequires an operational definition of an observation. The logic of this routine orientates itself partly through " clause entries "("which", "that", etc.), partly through the prepositions. The registers may thus contain strings consisting of several words. There may also be several words within a string which belong to different registers. The logic of the routine continues the matching procedure until it finds a new verb or a new clause entry. Since the model prescribes that an observation can only have one verb, the routine has resulted in the identification of an observation when it has been capable of determining the agent and objective functions.

The identification of the conceptual relations are made on the basis of a system of prepositions, whose validity has been tested for English, French, German, and Swedish. The prepositions have both a pointing and a demarcating function. In principle, the system works in the following way:

Example: Always when a preposition is missing, a Figure is identified: " Parents observed children " (Figure). When a preposition of the type " in ", " over ", " on " is present between the verb and the objective, a Ground is identified: " The children are crawling over edges " (Ground).

The basic premise of this specification has been discussed in I. Bierschenk, 1984b).

Of particular import for a cognitive attempt is the analysis of whether the Figure and Ground components may linguistically reflect direct perception. The purpose here is to study the way direct perception manifests itself in language with the point of departure in the theory of ecological perception (Gibson, 1979), which assumes invariant relations to be reflected through a medium in such a way that these can directly be picked up by some device developed for this purpose. Important for the understanding of our presentation, therefore, is not only the notion " perspective " but also the concepts of " figure " and " ground ". Both bind a natural text to an environment which has ecological significance. If

this environment is familiar, the figure - ground cooperation can be studied with respect to the ability of language to transmit differentiations of ecological nature.

Subjects. For a specification of structural information in a description of empirical observations only one observer would be required, since it is the agents such as they exist in running text that will constitute our measuring objects. On the other hand, a differential analysis requires a minimum of two subjects. Moreover, an informative and knowledge oriented text analysis would gain in sharpness and become more realistically useful, if a multivariate differentiation could be feasible. The prerequisite of the use of multivariate analysis techniques is that more than two subjects give their observational descriptions. When 12 or more subjects give their descriptions we may expect the reliability in the observations to be high (Guilford, 1954, pp 251-256). The experiment having had the key function in the attempt to test the capacity of the model to reflect experimental observations is the Visual Cliff experiment (Gibson & Walk, 1960). Since this experiment concerns childrens' ability to understand the meaning of a sharp drop, we have invited 16 parents having children of the same age (infants of crawling age). They participated in the experiment when they were booked for a regular control of their eight to nine months old infants at a Swedish Child Care Centre.

Material. A picture or a symbolic expression comprise viewpoints as well as a perspective. Since pictures, moreover, are assumed to function as links between mediated awareness and cognition, we have decided to let a series of four pictures published in Scientific American (1960, 202 (4), 65) be the starting-point to our question: What does it mean, if we start from the assumption that cognitive ability is something else than the ability to process sequential operations on a finite number of symbols? With this background the hypothesis can be formulated that cognitive ability primarily is equal with an organism's ability to perceive significant events in its environment. If this hypothesis is valid, the

picture series should afford observable expressions of conceptual relations of ecological significance and be reflected in the subjects' verbal formulations. Which structure will be accessible by the analyses, quite naturally, depends on which conceptual relations will become visible through the language.

Gibson and Walk describe the picture series as follows:

> Child's perception is tested on the visual cliff. The apparatus consists of a board laid across a sheet of heavy glass, with a patterned material directly beneath the glass on one side and several feet below it on the other. Placed on the center board (top left), the child crawls to its mother across the " shallow " side (top right). Called from the " deep " side, he pats the glass (bottom left), but despite this tactual evidence that the " cliff " is in fact a solid surface he refuses to cross over to the mother (bottom right).

Procedure. The aim of the experimental strategy chosen is to study how subjects use their language in their description of the events they have been able to observe in the four pictures. The task, therefore, was to describe the contents of the picture series in such a way that some other person would be able to make himself a conception of it. The kind of texts produced by the subjects may be illustrated with the following one:

> The child explores the table with touch and sight, and tries to find its way towards the unfamiliar. The child reacts to the danger that it will fall down the edge and stops. Being a parent, one would naturally step in when the child came nearer to the edge, which means that, perhaps, one steps in more often than one needs to.

All the parents participating in the investigation have met a female experiment leader for about 30 minutes during some periods in the autumn of 1983 and the spring of 1984. The meetings were arranged in connection with a regular information appointment held at the Child Care Centre in which both parents are instructed how

to prevent their children from accidents. The locality for the meetings and the experiments was the waiting room of the Centre and the experimental material could be presented as a natural part in the information the parents had come there for. Each subject received a photography of the page mentioned. Information about its source was given to them in connection with the distribution of the material, followed by instructions to the task.

Results

The methodological approach described has the advantage of being independent of the type of text and its length. Shall meaningful conceptual relations be detected, a text processing procedure within a multivariate analysis system is needed.

The efficiency of the model in synthesizing successive segments in a progressive textual development is based on the steering and controlling function of the agent. Different agents have different functions in a text and have probably been chosen to give expression to perspectival changes in the presentation of objects and events. A differential typological analysis of the agent function may give information about which profiles may describe the perspective underlying a textual flow. In such an analysis, it becomes necessary that the " relational affinity " of the observations gets its empirical determination.

A first step in the result analysis demands the set up of a series of matrices of the Nxp type, where N refers to the agents of the text and p to the objectives, whereas the a component represents affinity (0,1). This is the condition for a grouping of the agents. The division of a set of agents into groups is usually done with the help of a clustering algorithm. We have chosen Ward's (1963) algorithm for a hierarchic grouping with the purpose of optimizing an objective function. The procedure allows a reduction to (n-1) mutually exclusive groups. It operates with the union of all possible n(n-1)/2 pairs. In the forming of the groups, a union is chosen which has the maximum value with respect to the functional relation. For this purpose, the total sum of deviations is computed for each agent (point of estimation) from the average of the

cluster to which the agent belongs. At every step in the analysis process, pairs of clusters are brought together whose amalgamation reduces the loss of information, expressed as the " Error Sum of Squares ". The most desirable value is a minimum of .000.

Figure. Ecological significance means that the infant's behaviour on the visual cliff makes it evident that the environment has meaning for the infant. If an observer can verbally express the infant's intentional behaviour, the result ought to be a text which reflects ecological significance. To which conception the picture series has given rise depends on the viewpoints that have been identifiable. The process of concentrating the viewpoints begins with an Nxp matrix, which has 26 rows and 30 columns. The clustering has been executed with Wishart's (1982) CLUSTAN program. By transposing the original matrices it becomes possible to study the empirical grouping, not only with the agents as the starting-point but also with the Figure - Ground components of the model. An iterative application of the clustering algorithm on the viewpoints of the text creates a grouping which can represent the total configuration, i.e. the figure of the text. Figure 1 presents the cluster analysis results for both the original and the transposed matrix. In the determination of which viewpoints will form a group, usually two premises have been decisive, namely (1) there is an obvious break in the classification, or (2) the critical value has been applied such that the division results in collinear clusters which can be given a meaningful interpretation. The basis for the cluster formation in this analysis has been the number of significant clusters according to Wishart's (1982, p 14-15) " upper tail rule ". The result is given in Table 1.

The clusters based on Table 1 means that the smallest sufficient number of clusters for the Agent component can be determined to eight. The split criterion of ESS = .16 allows a differentiation into seven agent groups. For the Figure component the number of significant clusters is nine and the split criterion can be determined to ESS = .18, which gives eight significant groups. The prototypic-

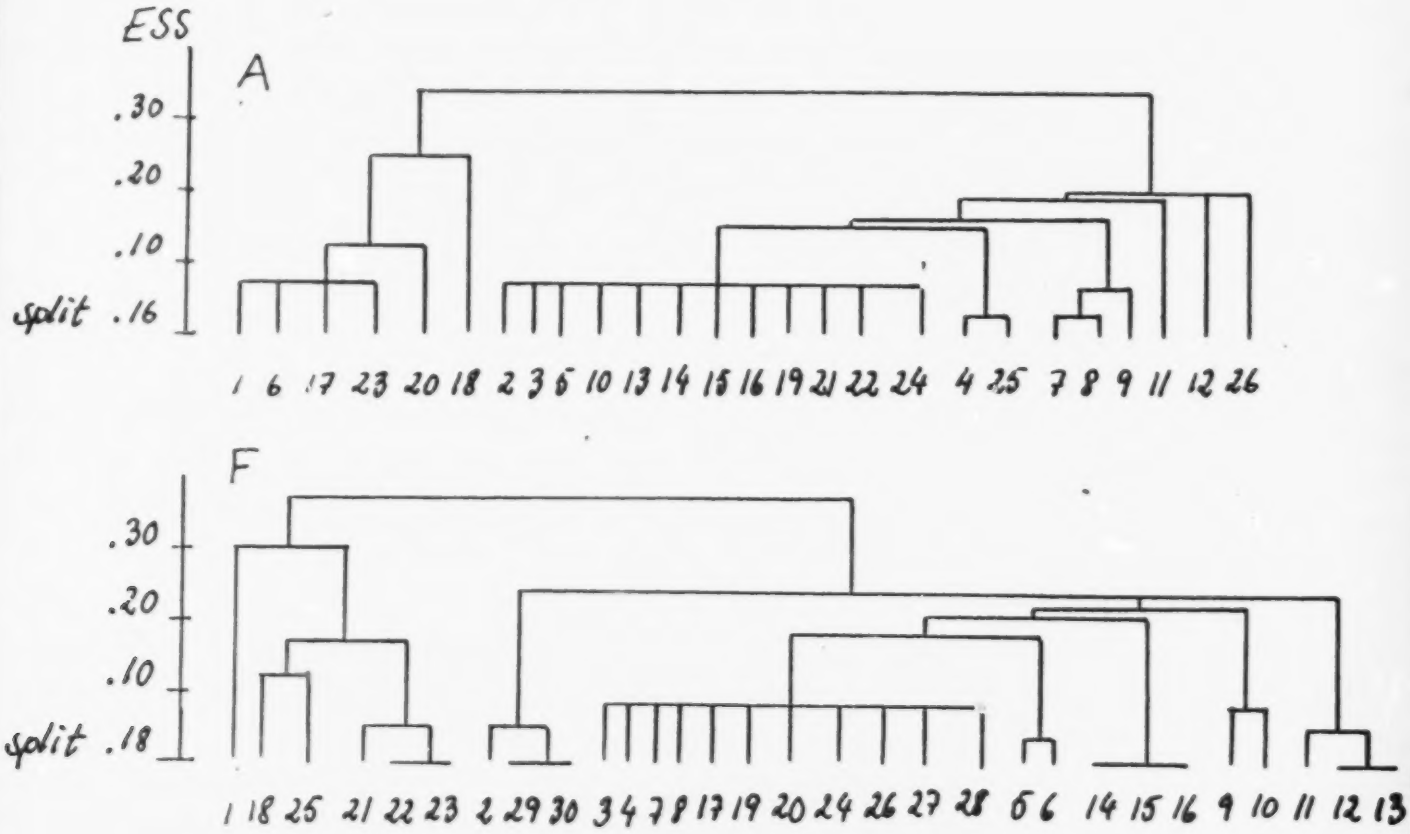

Figure 1. Patterning of agents and figures based on hierarchical cluster technique

al character of the groups is summarized in Tables 2-3. What is typical of the agent groups is defined by the Figure component. The descriptions give expression to a combination of viewpoints concerning the experimental design with viewpoints related to a child's placement and behaviour in an environment characterized by a sharp drop. However, of greater importance is the fact that the structured configuration of both objectives and agents can be observed. A graphical representation of the structures shows the viewpoints

Table 1. Levels of significance for Agent and Figure components

Clusters (C) No. of	Realised Deviates (a)	df	t= Cxa and Percentiles of the t-distributions
Agent	n=26, p=30, mean=.106, std dev= .076		
2	3.10	1	$t_{.90} < 4.38 < t_{.95}$
3	1.86	2	$t_{.95} < 3.22 < t_{.975}$
4	1.18	3	$t_{.95} < 2.36 < t_{.975}$
5	1.17	4	$t_{.95} < 2.62 < t_{.975}$
6	1.07	5	$t_{.975} < 2.62 < t_{.99}$
7	.72	6	$t_{.90} < 1.90 < t_{.95}$
8	.60	7	$t_{.90} < 1.69 < t_{.95}$
9	.18	8	$t_{.60} < .54 < t_{.70}$
Figure	n=30, p=26, mean=.106, std dev= .095		
2	2.73	1	$t_{.90} < 3.86 < t_{.95}$
3	2.07	2	$t_{.95} < 3.59 < t_{.975}$
4	1.44	3	$t_{.95} < 2.88 < t_{.975}$
5	1.40	4	$t_{.975} < 3.13 < t_{.99}$
6	1.18	5	$t_{.975} < 2.89 < t_{.99}$
7	1.04	6	$t_{.975} < 2.75 < t_{.99}$
8	.73	7	$t_{.95} < 2.06 < t_{.975}$
9	.69	8	$t_{.95} < 2.07 < t_{.975}$
10	.09	9	$t_{.60} < .28 < t_{.70}$

in relation to each other as well as what determines the perspective on a figure.

Topographic representation. Depending on the perspective chosen the linguistic variables get variable functions. The values they get allow a specification of the coordinative structure in a text. What structural links having been operating are shown in Figure 2 (p 14). Structures in the viewpoints constituting the figure of the text are displayed onto a background whereas the structural links in the agent groupings are presented on a foreground. We have chosen this form of presentation in preference to other possible ones in order to bring out the importance of the agent function for the control of the textual perspective. The differentiation of

Table 2. Cluster description for Agent component

Mobility	19 The child (12)
1 The child(1)	21 The child (4)
6 Bunk (6)	22 An experiment (10)
17 The mother (10)	24 One (I) (15)
23 Who (adult) (15)	4 The child (4)
20 The mother (14)	25 A child (16)
Significance	Protection
18 The child (11)	7 The child (7)
Orientation	8 I (6)
2 The child (2)	9 She (the mother) (6)
3 The child (3)	Challenge
5 The child (5)	11 The child (8)
10 The child (7)	Placement of Infant
13 One (I) (10)	12 Researchers (10)
14 Something (10)	Cessation
15 Squared pattern (10)	26 The child (16)
16 Area (10)	

Note. Numbers in paranthesis refer to subject no.

the agents shows that the dimensions of the perspective are different from those of the figure.

Incitement and Temptation seem to be the points of departure for the development of the figure. Common to both is their use with the aim of evoking the orientation of the child. The first dimension with its end poles Placement of Infant and Mobility expresses the degree of the child's consciousness. The second dimension is characterized through the poles Protection and Significance, which mark an awareness of the " value " of the surface and the ability to observe this value through the child's behaviour.

Table 3. Cluster description for Figure component

Mobility	
1 The child	
Significance	
18 Attentiveness	
25 Fear	
21 Contact	
22 Interest	
23 Curiosity	
Cessation	
2 The edge	
29 The board	
30 The basis (in front of child)	
Power of Incitement	
3 The playpen	
4 The hole	
7 The environment	
8 The threshold	
17 How (child, elevated part)	
19 Impression	
20 Something special	
24 Whether (outside edge)	
26 How (children, small)	
27 Importance	
28 A feeling	
Temptation	
5 Barrier	
6 The face	
Placement of Infant	
14 A child	
15 (Floor)	
16 The surface (squared)	
Protection	
9 The glass	
10 Security	
Challenge	
11 The danger	
12 The hight	
13 Novelty	

Note. Conceptual information in paranthesis is of a technical kind

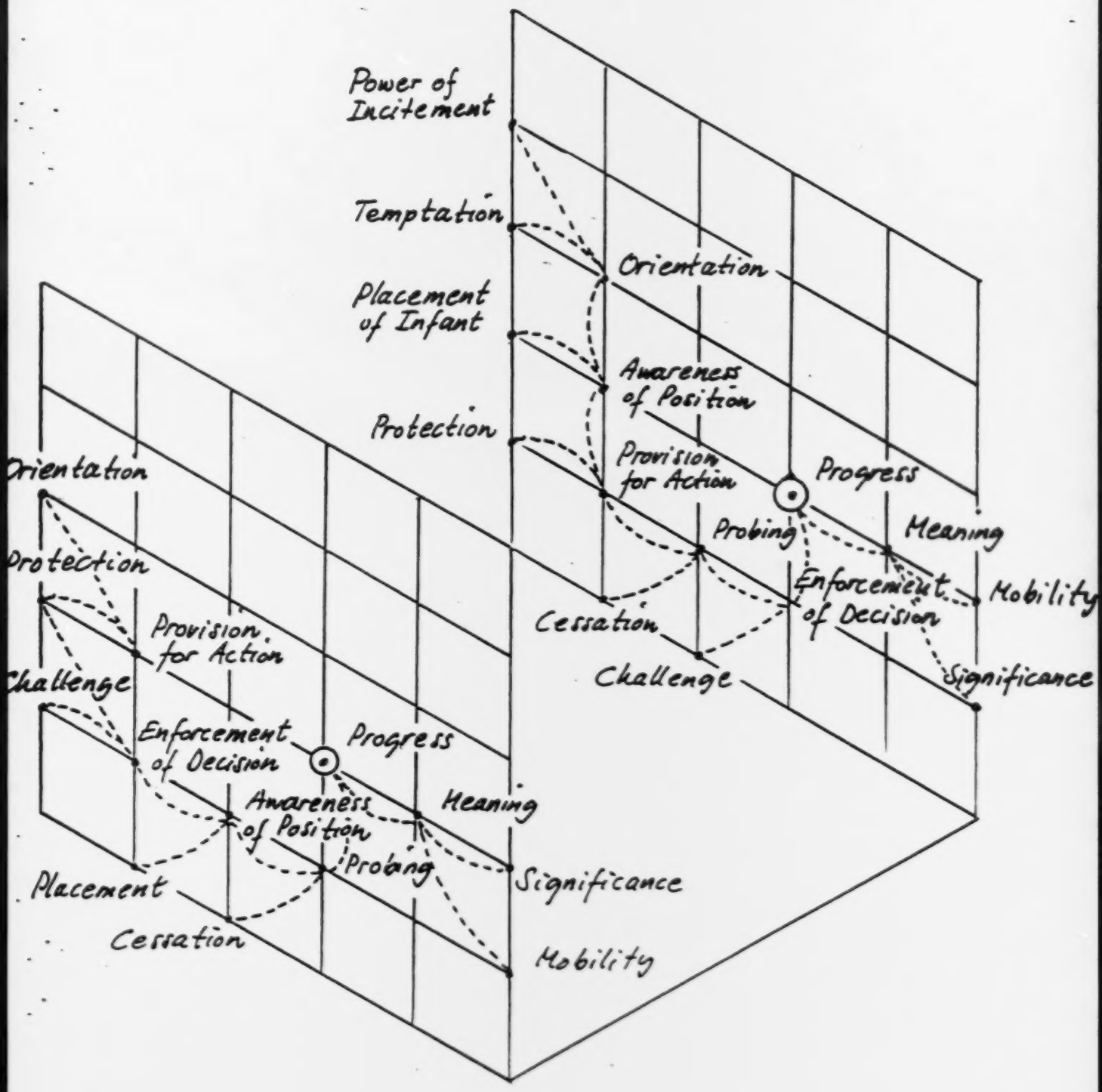

Figure 2. Topographic representation of perspective - figure relation

The starting-point for the development of the perspective seems to be the interest in security. The first dimension is described by the end poles Protection and Significance and reflects the original goal of the Visual Cliff experiment, namely to study the child's ability to perceive functions of higher order, that is invariant structure instead of single properties or qualities. The second dimension is defined by the poles Challenge and Mobility, which incorporate the necessity of movement so that the perception of a sharp drop can come about.

A comparison of the structural relations defining the figure of the text with the relations defining the perspective shows that the experimental environment has been perceived according to the original intentions. The ecological structure concerns the affordance of this edge to movement. To be sure, the view of a cliff needs not make any observer perceive ecologically significant information, and an edge in itself needs not be perceived as a call for action.

Ground. Observable events have to be connected with some reality or ground. The predominant conception within behaviour genetics (Royce & Mos, 1979) is that fear is genetically rooted and that it manifests itself in various behaviours leading to avoidance. A distinguishing of a figure from its ground would therefore make possible a study of what is conceived as being the ground of the child's behaviour. The clustering of the Ground component has led to the results shown in Figure 3. The pattern of the computed results has been examined with respect to its significant cluster formations according to Table 4. The division into groups according to the clustering of agents points to a split criterion of ESS= .14, which gives seven significant clusters and six groups. The groups with their prototypical descriptions are presented in Tables 5-6 (pp 18-19). The cluster formation within the Ground component has led to 11 significant clusters and eight groups.

Topographic representation. The Ground component forms the basis in Figure 4 (p 20). The perspective represented through the

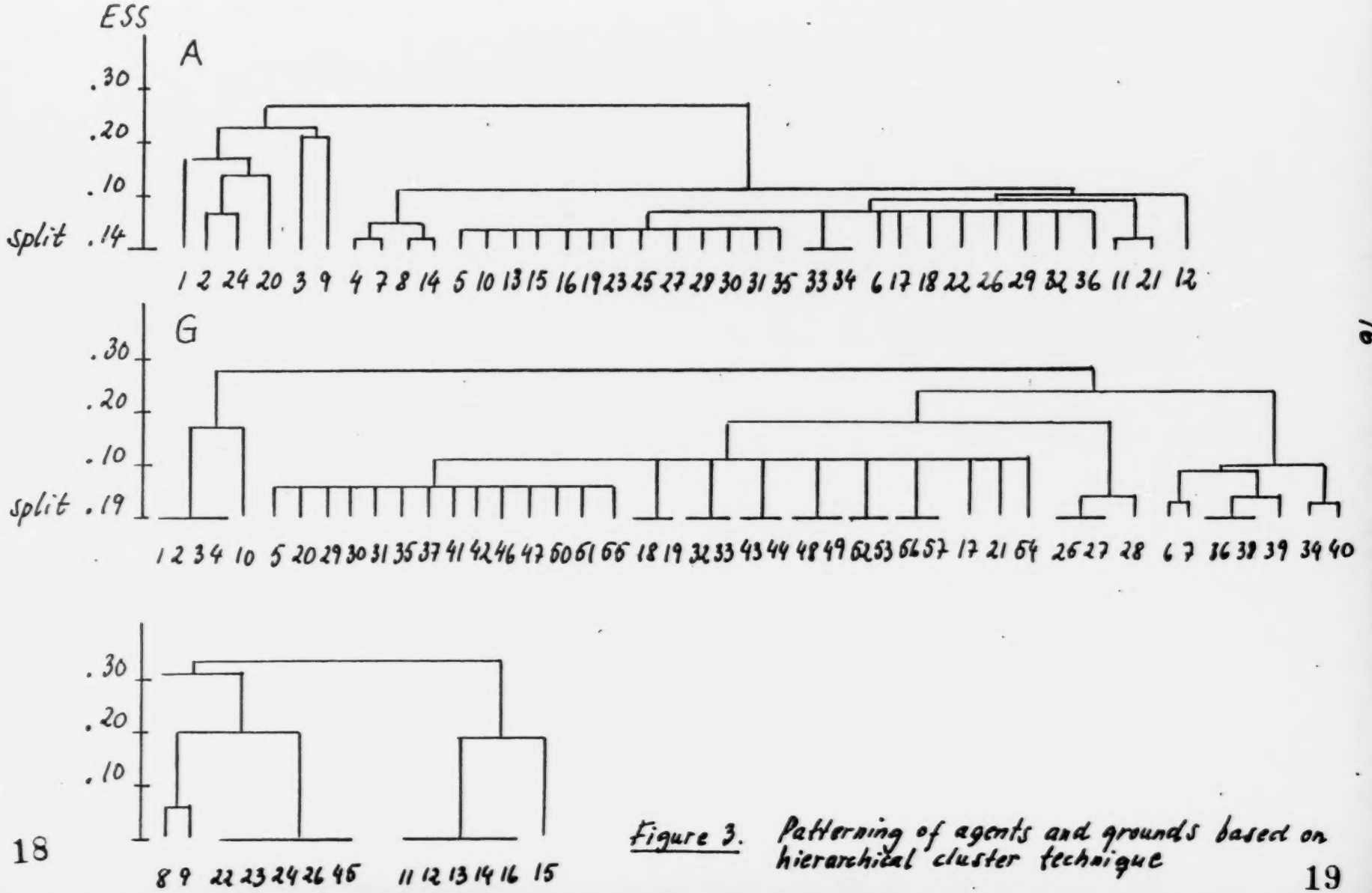

Figure 3. Patterning of agents and grounds based on hierarchical cluster technique

agents of the component forms the top. The ground is characterized by two dimensions. The first one, defined by the poles Attentiveness and Approachment to Mother, picks up information about the childs ability of showing its intention to survive. The second dimension, whose end poles are Enforcement of Orientation and Awareness of Barrier reflects negatively valued emotional reactions to hight. Both dimensions reflect that the Ground component could cap-

Table 4. Levels of significance for Agent and Ground components

Clusters (C) No. of	Realised Deviates (a)	df	t= Cxa and Percentiles of the t-distributions
Agent	n=36, p=57, mean= .072, std dev= .62		
2	3.24	1	$t_{.90} < 4.58 < t_{.95}$
3	2.47	2	$t_{.975} < 4.28 < t_{.99}$
4	2.24	3	$t_{.975} < 4.48 < t_{.99}$
5	1.53	4	$t_{.975} < 3.42 < t_{.99}$
6	1.09	5	$t_{.975} < 2.67 < t_{.99}$
7	.67	6	$t_{.90} < 1.77 < t_{.95}$
8	.46	7	$t_{.80} < 1.30 < t_{.90}$
9	.21	8	$t_{.70} < .63 < t_{.80}$
Ground	n=57, p=36, mean= .071, std dev= .081		
2	3.13	1	$t_{.90} < 4.43 < t_{.95}$
3	2.95	2	$t_{.975} < 5.11 < t_{.99}$
4	2.59	3	$t_{.99} < 5.18 < t_{.995}$
5	2.05	4	$t_{.99} < 4.58 < t_{.995}$
6	1.56	5	$t_{.99} < 3.83 < t_{.995}$
7	1.40	6	$t_{.99} < 3.70 < t_{.995}$
8	1.31	7	$t_{.995} < 3.71$
9	1.29	8	$t_{.995} < 3.87$
10	.48	9	$t_{.90} < 1.52 < t_{.95}$
11	.48	10	$t_{.90} < 1.59 < t_{.95}$

ture the sensitivity to hight as a natural cue to danger.

The perspective on the ground shows that not all the categories could be lifted up to the surface. The analysis shows one dimension with Exposure and Attentiveness as end poles. The perspectival focus is the child's movements with the purpose of avoiding the deep side of the visual cliff.

Table 5. Cluster description for Agent component

Judgment of Danger	19 Floor (10)
1 The child (1)	23 The child (13)
Exposure	25 The mother (13)
2 The child (2)	27 The mother (14)
24 Edge (13)	28 One (adult) (15)
Enforcement of Orientation	30 The basis (16)
20 The child (10)	31 The mother (16)
Awareness of Barrier	35 The mother (12)
3 The child (3)	33 The child (11)
Avoidance of Danger	34 The child (12)
9 The child (6)	6 The mother (3)
Attentiveness	17 Researchers (10)
4 The child (4)	22 Influence (photographer) (10)
7 The mother (4)	26 I myself (13)
8 The child (5)	29 The edge (16)
14 Curiosity (7)	32 The child (16)
5 Parents (1)	36 Something (12)
10 Bunk (6)	11 The mother (6)
13 The child (7)	21 The squared pattern (10)
15 The child (8)	12 I (6)
16 The child (9)	

Table 6. Cluster description for Ground component

Judgment of Danger	
1	To the unfamiliar
2	To the danger
3	Down the edge
4	Before the danger
Disregard of Temptation	
10	From the mother
Attentiveness	
5	In the situation
20	from falling
29	Within the child
30	In contact
31	On the squares
35	Breast-high
37	Over the impression
41	To (child, glass surface)
42	Near (to its mother)
46	Far away from the mother
47	Behind the child
50	From the child
51	To (child, fear)
55	On the table
18	To the other side of the table
19	At divergences
32	In a playpen
33	In relation to the glass surface
43	Beside (the table)
44	Outside the edge
48	There (behind the edge)
49	Nearer to the child
52	To (child, careful)
53	To come
56	Over the plexiglass board
57	On the squared basis
17	To an other place
21	On the little one
54	In front of the child
25	On the glass
27	Within the fence
28	In the danger
Enforcement of Orientation	
6	On expedition
7	Towards the danger
36	On the (elevated) part
38	Before the glass surface
39	On the glass surface
40	On the squared part
Oriented Action	
8	On the table
9	Towards the mother
Avoidance of Danger	
22	From the hight
23	Towards the board
24	From the so called danger
26	Over the glass
45	On a bunk
Awareness of Barrier	
11	Out on the table
12	In the environment
13	To the other side of the table
14	Between himself and the mother
16	Into the hole
Approachment to Mother	
15	To the mother

Note. Expressions without prepositions are due to the translation

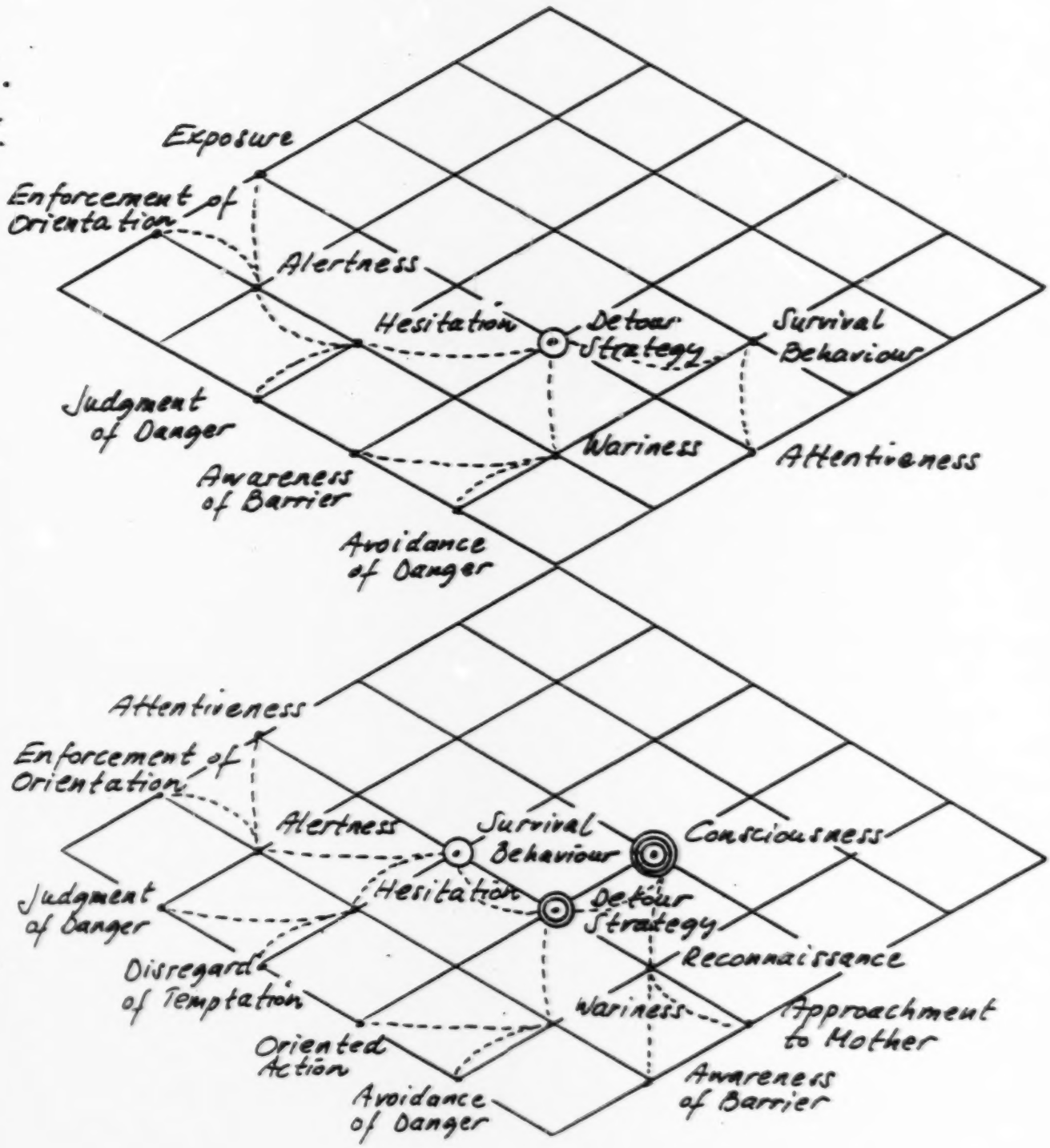

Figure 4. Topographic representation of perspective - ground relation

Discussion

The traditional standpoint in the analysis of verbal material is that language production builds on laws of association. This may be said about artificially defined material, such as single sentences, when the purpose is to analyse it for a formalization of its superficial links to generate simple and composed patterns. The conception of a subject or a physical system that is being formalized with this background can therefore only communicate an organization of patterns. The development of pattern recognition algorithms, for example, is founded on this assumption.

Naturally developed material, such as picture descriptions, interviews, unrestricted responses in questionnaires, open questions, observations in group situations, projective material, autobiographies, policy statements, official reports, newspaper articles or papers in scientific journals, is characterized by structure, which does not invite to superficial linking.

Typical of the method we have presented here is that it may be an alternative to those methods in which words and phrases are treated as bits in a syntactic puzzle. Thus, we have presented the AaO paradigm, which defines the relations denoting the functions to be expressed in a verbal statement. With the point of reference in our model, this means that a functional differentiation takes place between linguistic units. The rule system developed has become sufficiently specific to be processed computationally, and, as a consequence we have been able to point to the possibility of

(1) differentiating between the description of a perceptual object and the perspective,
(2) designing an algorithmically operating system with a few coordinatively cooperating basic components, and
(3) identifying the agent function as the foundation for a development of ecologically significant conceptual relations.

Potential use. Social science research involves the need for considering various contexts and environments. Thus, it is not so much a question of the absolute processing capacity that a single

living system has at its disposal or that a non living system is equipped with. It is more a question of the perspective from which single phenomena shall be viewed. An object-governed information processing could, for example, concern an official report about consumer cooperates in Sweden. If we try to generate information from this text by manipulating the object component, a series of more or less familiar facts and circumstances become accessible, but the underlying perspective, which would add to the analysis new and significant information, remains hidden. The same analysis becomes still less close to a realistic ground, if the matter would be to find out by an interview study the policy on which single representatives of consumer cooperates offer their opinions. Information processing based on a crystallization of a sequence of separate cognitive operations may look effective but it can hardly extract those perspectives underlying the verbalization.

Sometimes it may also be a matter of analysing which knowledge policy or political line is represented in newspaper articles or data for decision making. In these cases, the facts available seem to be well known and of subordinate import. They have virtually no other function than to bring out the perspective of the source. The aim to differentiate operationally between the perspective (the subjective aspect) and the objective (the objective aspect) emerges even more noticeably in connection with attitude studies. In these studies, the objective aspect seems to be almost trivial as to the news value, whereas the subjective aspect is the dominant one.

A definition of knowledge within cognitive science research must necessarily discern this subject - object dimension without which models for knowledge representation are artificial. In contrast to the traditional way of investigating knowledge, that is to let the object component govern the analysis, our analysis system is governed by the subject component (agent function), which increases the realism of the knowledge analysis by its being capable of differentiating out the perspectival information.

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